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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,172	04/29/2005	Jolinde Machteld Van De Graaf	TS1320 US	9201

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SHELL OIL COMPANY  
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EXAMINER
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LAWRENCE JR, FRANK M

ART UNIT	PAPER NUMBER
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1724

MAIL DATE	DELIVERY MODE
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05/25/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/533,172

Applicant(s)

VAN DE GRAAF ET AL.

Examiner

Frank M. Lawrence

Art Unit

1724

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities: The preliminary amendment inserts "We claim:" on page 12, however page 12 is within the body of the specification. It is requested that section headings such as "Field of the Invention" and "Background" be inserted into the specification for clarity. The reference to a specific claim in line 4 of page 4 should be deleted because the claims can be amended, canceled or renumbered during prosecution. A period "." should be inserted in line 15 of page 6.

Appropriate correction is required.

2. Claims 7, 9, 10 and 22 are objected to because of the following informalities: In line 4 of claim 7, "%" was erroneously deleted in the preliminary amendment. In claims 9 and 22, "less than" should be inserted before the first instance of "5 Å" to remain consistent with the specification and clarify the claims (see page 6, new claim 17). In line 4 of claim 10, ", the regeneration gas stream" should be deleted. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2-6, 9-12, 15-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 2 and 15 are indefinite because it is unclear whether "associated gas" is meant to mean "gas associated with natural gas" or some other type of gas. This term is not defined in the specification. If "associated gas" is a known term of art, please

Art Unit: 1724

explain it to the examiner. Claim 9 is indefinite because the term “if present” does not require the presence of the second bed that is already positively recited in claims 7 and 9. Claim 15 is indefinite because it contains an improper Markush group. To overcome this rejection, “or” should be changed to “and.” Claims 3-6, 10-12 and 16-19 are rejected for depending from a rejected parent claim.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 2, 7 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Eck et al. (3,470,677).

7. Eck et al. ‘677 teach a process for reactivating a zeolite, comprising adsorbing hydrogen sulfide or mercaptans from a natural gas stream onto a zeolite having effective pore diameter of from about 4-10 angstroms, then regenerating the zeolite using a stream of heated inert gas containing low temperature steam (see col. 1, lines 12-66, col. 3, lines 10-20).

8. Claims 1-3, 7 and 13-16 are rejected under 35 U.S.C. 102(b) as being anticipated by the UK patent application (GB 2275625 A).

9. GB ‘625 teaches a process for removing hydrogen sulfide and organic sulfur compounds from a natural gas comprising contacting the gas with sulfolane in an absorber, contacting absorber effluent gas with a type 5A or 13X zeolite (pore diameter of at least 5 angstroms), then regenerating the zeolite with heated product gas from a second adsorber in the presence of water

Art Unit: 1724

that can also be adsorbed on the zeolite (figure, page 1, lines 9-15, page 2, lines 5-31, page 3, lines 10-18, page 4, lines 12-18).

10. Claims 1-3, 7, 13-16 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Sherman et al. (4,329,160).

11. Sherman et al. '160 teach a process for removing hydrogen sulfide and mercaptans from a natural gas stream, comprising contacting the stream including up to 5 mole % H<sub>2</sub>S with a zeolite having a pore diameter of at least 5 angstroms at a temperature of 60-120° F and a pressure of 200-1200 psi, then regenerating the zeolite with a portion of a hydrocarbon product stream having an appropriate amount of water vapor added, such as 0.185 mole % (see figure, col. 1, lines 1-68, example 1).

12. Claims 1-3, 7, 8, 13-16, 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Turnock et al. (3,620,969).

13. Turnock et al. '969 teach a process for removing sulfur compounds from a liquid natural gas stream, comprising contacting the stream with a zeolite having a pore diameter of greater than 5 angstroms at a linear velocity of 0.1-20 feet per minute, then regenerating the zeolite with an inert gas containing moisture to a dew point level of 10-160°F and heated to 500-700°F (see col. 2, line 37 to col. 3, line 60, col. 4, lines 27-75, col. 5, lines 46-65). The sulfur compounds can include up to 2 weight % hydrogen sulfide or organic sulfides such as mercaptans, disulfides, thiophene and carbonyl sulfide, and the zeolite can include a binder.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1724

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 4-6 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB '625 in view of Gingrich et al. (6,074,459).

16. GB '625 discloses all of the limitations of the claims except that water in the feed stream contains water that is removed on a zeolite having a pore diameter of less than 5 angstroms and that a preferred temperature, pressure and gas velocity are used. Gingrich et al. '459 discloses a process for removing contaminants from a natural gas comprising flowing the gas through a first adsorbent bed including a zeolite 3A or 4A for adsorbing water and a second bed including a zeolite for adsorbing sulfur compounds (see col. 3, lines 4-46). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the adsorbent beds of GB '625 by using an upstream bed of zeolite 3A or 4A in order to optimize the capacity of subsequent beds. Absent a proper showing of criticality or unexpected results, the temperature, pressure and flow rate are considered to be parameters that would have been routinely optimized by one having ordinary skill in the art based on the adsorption characteristics and application size.

17. Claims 8-12 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman et al. '160 in view of Gingrich et al. '459 and taken together with Turnock et al. '969.

18. Sherman et al. '160 disclose all of the limitations of the claims except that the zeolite contains a binder, there is an additional bed of zeolite having a pore diameter of less than 5 angstroms, and that a preferred temperature, pressure and gas velocity are used. Gingrich et al. '459 and Turnock et al. '969 disclose natural gas purification methods as described in paragraphs

13 and 16 above. It would have been obvious to one having ordinary skill in the art at the time of the invention to use an additional zeolite bed and process parameters for the same reasons given in paragraph 16 above. It would have also been obvious to use a zeolite with a binder in order to provide a sorbent that retains its selectivity and capacity.

### *Conclusion*

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional references listed on the attached PTO-892 form disclose natural gas desulfurization methods.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank M. Lawrence whose telephone number is 571-272-1161. The examiner can normally be reached on Mon-Thurs 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 1724

Frank M. Lawrence

Primary Examiner

Art Unit 1724

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*Frank Lawrence*

*4-26-07*